NASA TECH BRIEF

Computer Programs for Determination of Transonic Flow Parameters in a Convergent-Divergent Nozzle

A package of computer programs has been developed to facilitate the determination of transonic flow parameters in a convergent-divergent nozzle. The programs are based on equations that include various functions for boundary values along the nozzle axis, yielding different types of flow field configurations. Any appropriate streamline in the flow field thus constructed may be considered as the nozzle-wall contour.

The documentation for this program details the method of calculating the subsonic flow field and the sonic line. It also describes a modification of the method of characteristics for calculation of the supersonic flow immediately downstream of the sonic line.

Notes:

1. The programs are written in FORTRAN IV for use on the CDC-6600 computer.
2. The main advantage of this method of solution of the flow problem is that it provides for an accurate computation of the flow in the regions upstream of the nozzle throat. The computations are required for calculations of boundary layer and heat transfer values in the entrance cones of a rocket nozzle or related devices subjected to supersonic flow problems.
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under contract to
NASA Pasadena Office
(NPO-10895)

Category 09